

## ARGUMENTS/REMARKS

Claims 15, 21, and 22 have been withdrawn. Claims 2 and 20 have been canceled. Claims 1, 3, and 16 have been amended. Claims 1, 3-14, and 16-19 are pending.

The election of claims 1-14 and 16-20 is affirmed.

The office action rejected claim 1 under 35 U.S.C. 102(b) as being anticipated by Vallon et al. (JVST A 1997). Claim 1 has been amended to incorporate the limitations of claim 2. For at least this reason, claim 1, as amended, is not anticipated by Vallon et al.

The office action rejected claims 2-14 and 16-20 under 35 U.S.C. 103(a) as being unpatentable over Bu (US 2004/0067631 A1) in view of EP 0200951 A2, Yang et al. (US 6,451,647 B1) and Kim et al (Electrochem. Soc. Proc. 1999). Claim 1 has been amended to incorporate the limitations of claim 2, so that claim 1, as amended, is claim 2 written in independent form.

The office action stated that Bu discloses a method of etching comprising etching a silicon cap, but fails to disclose etchants for various layers. The office action further stated that Vallon teaches etching the SiGe layer with HBr, and inert diluent, and O<sub>2</sub> at a temperature below 40° C in the method of Bu, because Vallon teaches that this is useful for patterning SiGe. The office action further stated that EP0200951 teaches that an etchant gas of N<sub>2</sub>, SF<sub>6</sub>, and CHF<sub>3</sub> is useful for etching silicon at high rates and anisotropy, as disclosed in col. 4, lines 1-14, and the abstract of EP0200951 A2. The office action also states that Kim teaches that doped and undoped polysilicon can be etched at the same etch rate with SF<sub>6</sub> or to minimize isotropic etching effects a polymer-forming gas, HBr, is added to SF<sub>6</sub>.

It would not be obvious to combine the etch gas of EP 0200951 A2 and Kim with the processes of Bu, and Vallon to obtain the method as recited in claim 1, as amended. Although EP 0200951 A2 and Kim may teach an etch chemistry of N<sub>2</sub>, SF<sub>6</sub>, and CHF<sub>3</sub> to etch a polysilicon layer, these references do not teach or suggest that such an etch has the desired chemistry to etch a polysilicon layer over a SiGe layer. EP 0200951A2 discloses etching a polysilicon layer 30 over a crystalline silicon layer 32 (col. 3, lines 25-41 and FIG. 2 of EP 0200951 A2). Kim discloses etching a polysilicon layer over an oxide gate layer (bottom of page 361). Neither of these references disclose nor suggest that an etch with N<sub>2</sub>, SF<sub>6</sub>, and CHF<sub>3</sub> would be successful in

etching polysilicon over SiGe without significantly damaging the SiGe. Such a combination is not predictable, since in plasma processing various outcomes are unpredictable.

In addition, it would not be obvious to combine the cited reference to teach or suggest doping the cap layer 22 of Bu. The cap layer 22 of Bu is an optional layer [0036]. Bu does not teach or suggest doping such a cap layer. The office action failed to point out anything or provide any motivation for doping the cap layer 22 of Bu. Therefore it would not be obvious to provide a breakthrough etch of a polysilicon layer with at least one doped region, as recited in claim 1, as amended.

In addition, it is not obvious that the chemistry of Bu would successfully etch a doped polysilicon region. Since plasma etching is unpredictable, the results of such an etch are unpredictable. For at least these reasons, claim 1, as amended, is allowable.

Claim 16 has been amended to incorporate the limitations of claim 20, and thus recited etching a polysilicon layer with at least one doped region and at least one undoped region. The office action cited the last paragraph of p. 362 and Table 1 on page 364 of Kim as teaching doped and undoped regions. If the office action is equating n-type and p-type polysilicon mentioned as n-doped and p-doped polysilicon, then both the n-type polysilicon and the p-type polysilicon are both doped and neither region is undoped. Applicant did not notice the specification of an “undoped polysilicon” region in Kim. As mentioned on page 4, lines 15-18, of the present application, undoped regions of polysilicon have different etch characteristics than doped regions. Therefore it would not be obvious that such an etch would provide the same etch characteristics for doped and undoped regions. For at least these reasons, claim 16, as amended, is not made obvious by the cited references.

Dependent claims 3-14, and 17-19 are also patentably distinct from the cited references for at least the same reasons as those recited above for the independent claims, upon which they ultimately depend. These dependent claims recite additional limitations that further distinguish these dependent claims from the cited references. For example, claim 3 further recites a main etch with an etchant gas with at least one of  $\text{Cl}_2$ ,  $\text{HBr}$ ,  $\text{CF}_4$ , and  $\text{O}_2$ . It would not be obvious to combine the etch chemistry cited in the office action from col. 11, lines 20-22, 32-33, and col. 14, lines 7-10, of Yang with the etches of Bu, Vallon, Kim, and EP 0200951 to obtain the combination of the break through etch of the break through etch, recited in claim 1, main etch recited in claim 3, and silicon germanium etch, recited in claim 1. The office action failed to

point out anything in these references that teach a separate break through etch. In addition, the cited portion of Yang teaches that the etch process is able to equally etch through polysilicon and SiGe, therefore there is no motivation for using this step in a process with a separate SiGe step with a different etch chemistry.

In addition, claim 9 recites that the polysilicon layer has at least one undoped region. The office action cited the last paragraph of p. 362 and Table 1 on page 364 of Kim as teaching doped and undoped regions. If the office action is equating n-type and p-type polysilicon as n-doped and p-doped polysilicon, then both the n-type polysilicon and the p-type polysilicon are both doped and neither region is undoped. Applicant did not notice the specification of an “undoped polysilicon” region in Kim.

In addition, claim 17 is dependent on claim 16 and further recites a main etch of the polysilicon layer. The cited art does not disclose or make obvious the specific combination of two different etches of a polysilicon layer with a doped region and an undoped region, as recited in claim 17. For at least these reasons, claims 3-14, and 17-19 are not anticipated or made obvious by the cited references.

Applicants believe that all pending claims are allowable and respectfully request a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at telephone number (408) 255-8001.

Respectfully submitted,  
BEYER LAW GROUP LLP

/Michael Lee/  
Michael Lee  
Reg. No. 31,846

P.O. Box 1687  
Cupertino, CA 95015-1687  
(408) 255-8001